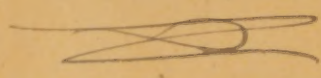


E AGLETON (S.P.)

A résumé of the history and
practical application of
hydrogen peroxide in
surgical affections.



A RÉSUMÉ OF THE HISTORY AND PRACTICAL APPLICATION OF HYDROGEN PEROXIDE IN SURGICAL AFFECTIONS.

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(Medical and Surgical Reporter of Philadelphia, May 16, 1891.)

Hydrogen peroxide was discovered by M. Thenard, a French chemist, in the year 1818, since which time it has, like many other therapeutical remedies, lain dormant, occasionally being brought forward by some "enthusiast" and its virtues highly extolled for a time. But the drug, unequal to the task of proving all that had been said in its favor, was again and again returned to its stall of oblivion. Within the past few years, it has been brought before the medical profession, on account of its antiseptic properties, and apparently has awakened into active therapeutic life.

In looking over the literature on the subject, I find that Dr. B. W. Richardson,¹ in 1852, called attention to the action of hydrogen peroxide in an article upon the subject, which excited wide spread interest in the profession at that time and has led to many experiments with the drug, both in surgery and medicine.

It is my purpose to confine myself in this study entirely to the treatment of surgical affections. Before referring to the results of my own experience, during the past few months, I will briefly allude to some of the most important monographs which have appeared from time to time in our medical journals. C. T. Kingzett² believes that the substance exhibits striking antiseptic effects and is capable, even in very small quantities, of arresting the so-called process of fermentation which is originated by living organisms. He further calls attention to the fact that care should be exercised in making the solution neutral before using, and yet admits that neutral solutions are by no means as stable as are those of a slightly acid reaction. In closing his monograph he states that the expectations of several noted surgeons of France in the treatment of wounds with this compound have been amply realized; among those may be mentioned M. Baldy, M. Regnard and M. Beau. In summing up his article he further says that, in his opinion, hydrogen peroxide is far superior to phenol, and that it has been demonstrated beyond question that all wounds treated with peroxide of hydrogen have progressed well, healing generally by first intention.

A. E. Prince³ speaks most favorably of the results obtained with this remedy.

C. E. Shelley⁴ considers it to possess anæsthetic properties, and at the same time claiming for the drug, not only a pus-destroyer, but that it is an actual stimulant to the surface of wounds. To the carefully conducted experiments of Dr. P. Miquel, quoted by W. D. Bizett,⁵ we owe the establishment, on a firm basis, of hydrogen peroxide as a positive germicide. The line of experimentation pursued had the following aim: to determine the quantity of various substances, commonly used as germicides, which, added to a quart of beef tea, would prevent decomposition. Miquel found among a

¹B. W. Richardson, *Tr. M. Soc. Lond.*, 1862, vol. II, pp. 51-53.

²*Ibid.*

³A. E. Prince, *St. Louis, M. and S. Journal*, 1884, vol. XLVI, pp. 246-252.

⁴C. E. Shelley, *Practitioner*, Lond., 1884, vol. XXXII, p. 196.

⁵W. D. Bizett, *Atlanta M. and S. Journal*, 1888-9, N. S.

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long list of substances used by him, that only two were more powerful than hydrogen peroxide. The following table shows the relative strength, according to his experiments, of the four most powerful germicides :

| | |
|-------------------------|---------------|
| Binioidide Mercury..... | 0.025 grains. |
| Binioidide Silver..... | 0.03 grains. |
| Hydrogen Peroxide..... | 0.05 grains. |
| Bichloride Mercury..... | 0.07 grains. |

The results thus obtained place hydrogen peroxide ahead of bichloride mercury as a germicide, with the advantage, also, of being absolutely void of any toxic action, while the corrosive sublimate is a most virulent poison. Bizett¹ claims that when the pure peroxide, which is syrupy in consistence, is brought into contact with living tissues, it acts as a direct caustic. Various experiments were made by H. Gifford² directly with the *disease germs*, thus testing the germicidal action of the peroxide. Two methods of determining its ability to destroy germs, were used, that of Koch, and his own well-known method. The preparation of peroxide used, was that of Chas. Marchand's (15 vol.). Gifford found that the white and yellow cocci, as well as the bacilli anthrax, were killed in exposures of from $\frac{1}{4}$ to 1 $\frac{1}{2}$ minutes. It required but $\frac{1}{4}$ of a minute to destroy fully developed anthrax spores. He further found that the solution exposed for 40 days, to a temperature of 68-75° killed the yellow pus cocci in from 10-11 minutes. The same solution of peroxide, when diluted with *four* times its bulk, requires an exposure of 30 minutes to kill the pus cocci. If diluted with an equal volume, it kills within $\frac{1}{4}$ minute. After an experience of six months, I. N. Love³ sums up the action of hydrogen peroxide as follows : It is a most efficient means of cleansing purulent surfaces, deep cavities and sinuses, stimulating the healthy process in ulcerating parts. As a destroyer of microbes, a cleanser and securer of comfort, it is of great value as a local application.

My own experience with this drug in surgical affections, during the past ten months, has been most satisfactory. During that time I have used the remedy in the following affections : Abscesses (acute and chronic, of various kinds), suppurating glands, sloughing gangrenous wounds, empyema of the chest, necrosis (general and localized), suppurative otitis media, and wounds of all descriptions. The ages of the cases treated, varied from two to thirteen years. The mode of applying the peroxide was as follows : All cavities, crevices, etc., were syringed with the bichloride of mercury (1-2000, to 1-6000) and then carefully cleansed with the hydrogen peroxide (Marchand's).

At first one volume of this solution was diluted with two to three times its bulk. Later on, I used the full strength. The first effect noticed after applying the peroxide, was the rapid oxidation of all purulent or bloody material, which would cause the distention of crevices, no matter how minute, with the oxygen, which was eliminated as a frothy (often yellowish, depending upon the quantity of pus present) bubbling substance. After the oxidation was completed, the wound was always left in a clean, sweet condition, absolutely free from pus. The wounds were then gently dusted over with iodoform and the usual antiseptic dressings of gauze, etc., were applied. On removal of the dressings, a few days later, it was noticed that the wounds were in almost every instance cleaner (especially marked in acute cases), more healthy in appearance and with a decided diminution in the quantity of pus secreted. The thought being suggested, that possibly the bichloride and not the peroxide was instrumental in producing the favorable results noticed, I commenced a series of control experiments. I would, at one dressing, use simply the bichloride of mercury, following this, at the next dressing, with the peroxide. Thus making actual comparisons in the same cases. After several alternate dressings as above, I found *without exception* that the hydrogen peroxide perceptibly diminished pus formation to a much greater degree than simply the bichloride alone.

¹W. D. Bizett, *Atlanta M. and S. Journal*, 1888-9, N. S.

²H. Gifford, *Med. Rec.*, N. Y. 1888, vol. XXXIV, p. 243.

³I. N. Love, *Phila. Med. Times*, 1887-1888, vol. XVIII, pp. 362-364.

The belief that iodoform should not be used in conjunction with the peroxide, for fear of liberating free iodine, which, as a direct irritant, would defeat the object in view, is, I believe, erroneous. I found that when a quantity of iodoform was placed in a small receptacle covered with the peroxide solution and then set aside for periods varying from three hours to three days, on being treated chemically for free iodine, with the ordinary starch test, gave negative results. Although one drop of a solution of iodine, on being added to the same solutions, gave a brilliant reaction on addition of the starch.

In all cases in which the peroxide was given a fair trial, I have observed a direct healing effect upon the granulating tissues. It is therefore evident that, owing to its oxidizing action on the pus and the diminution of the purulent secretions after its use, it does, either directly or indirectly, cause a destruction of the anthrax bacillus. In concluding my article, I think, from the chemical as well as the experimental evidence which has been deduced, we can safely sum up the action of peroxide of hydrogen in the treatment of surgical affections, as follows :

1. Hydrogen peroxide is a positive germicide and a possible stimulant to granulating tissues.
2. Owing to its especial property of eliminating oxygen, it is of unparalleled value in the distention of suppurating sinuses and cavities, especially in the mastoid region, or where it is almost impossible to reach unhealthy surfaces by other means.
3. The diluted solution is perfectly harmless and can with safety be used in any quantity.
4. The strong concentrated solution, syrupy in consistence, is a direct irritant to all tissues and should never be used.
5. It possesses healing and cleansing qualities as well as those germicidal in nature.
6. When exposed to light it loses strength ; care should therefore be exercised in keeping the bottles well stoppered with rubber corks, and in a cool, dry place.
7. Fibrin, cellular tissue and some metals, instantly decompose it. In contact with sugar and starch it eliminates carbon dioxide (CO_2).
8. In washing suppurating surfaces, it should be used until oxidation ceases, thus showing a complete destruction of all existing purulent material.¹

EXTRACT FROM PAPER ON "ADJUVANTS OR AIDS TO GYNÆCOLOGY—NEITHER MEDICAL NOR SURGICAL."

By C. A. PHILLIPS, M.D., OF BOSTON, MASS.

Read before the International Congress of Homœopathy, held at Atlantic City, June 19, 1891.

Another local application of great service in the treatment of gonorrhœal or syphilitic and all ulcerative conditions of the genital organs is Marchand's Peroxide of Hydrogen. While its power to destroy germs and septic matter with which it comes in contact is unsurpassed by any other germicide or antiseptic, it is perfectly harmless to living tissues. With a swab of cotton saturated with this solution the parts can be more thoroughly cleansed than by any other means with which I am acquainted,—thus removing effete poisonous or septic matter, and I cannot understand wherein this is any more objectionable than cleansing the skin with soap and water, or the teeth with a brush.

¹Read before the D. Hayes Agnew Surgical Society of the undergraduates of the Medical Department of the University of Pa., February, 1891.

MEDICINAL PEROXIDE OF HYDROGEN AND GLYCOZONE.

By Dr. J. H. DE WOLF, of Baltimore, Md.

(*The Southern Medical and Surgical World*, of Baltimore, Md., August, 1891.)

The topical application of Oxygen is capable of immense benefit. In the pitting of Small-pox I most earnestly advocate and urge its use, either in the form of Glycozone or properly diluted Marchand's Peroxide of Hydrogen (Medicinal). I believe much deformity can be obviated by its use, and the force of the disease lessened. Foul and indolent ulcers, when treated by iodoform, carbolic acid, etc., are apt to poison the patients; such cases have occurred. With oxygen that would be impossible. In large suppurating sores, where the various germicides are dangerous on account of the large breach of continuity and absorption of the poison, the topical application of oxygen is perfectly safe, and to say the least, equally efficacious.

Ophthalmia is advantageously treated by the topical application of either the Peroxide or Glycozone. Styes can be aborted if Glycozone be rubbed on the lids at the commencement; and as styes are painful, and swelling and pain last for a few days, the use of Glycozone is satisfactory to both patient and physician. In nasal catarrh, when the mucous membrane is dry and crusts form, prompt and more satisfactory results can be obtained from Glycozone than from any other means known.

In the various chronic inflammations of the throat which are ordinarily obstinate to treatment, I have frequently satisfactorily treated by the Peroxide (diluted,) especially when the orifice of the eustachian tube was closed by swelling, and the patient rendered uncomfortable by temporary deafness and ringing in the ears.

PEROXIDE OF HYDROGEN, MATERIA MEDICA AND THERAPEUTICS.

Vol. II., Page 681, 1891. By JOHN V. SHOEMAKER, A.M., M.D.

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PHARMACOLOGY.—The usual strength of peroxide of hydrogen is called the fifteen-volume solution, because each portion of the solution yields fifteen volumes of the oxygen. It is prepared by Charles Marchand, New York, for medical use, and is an active oxidizing and antiseptic agent. Glycozone is the trade name of a similar preparation in which glycerine is the vehicle.

THERAPY.—Though less powerful than many other antiseptics, the solution of hydrogen peroxide has a special place in surgery, gynecology, and obstetrics, on account of its power of decomposing pus and destroying the microbes of suppuration. Being free from all irritating qualities, it can be poured over wounds, injected into sinuses, or into the ear, or used as a spray in ulcerations of the pharynx and of the larynx.

It produces a frothing up when it encounters pus, owing to the liberation of oxygen, and the cessation of this commotion indicates the removal of all pus. The surface of the wound or ulcer becomes blanched, but it is not injured by the application.

Tubercular and mammary abscesses especially are well treated in this way. In ulcerative tonsilitis, fetid breath, and in some bronchial affections, a spray of dilute hydrogen peroxide is productive of benefit. A spray of this agent is likewise of utility in chronic nasal catarrh, ozæna, and scarlatinal angina. It has been administered, well diluted, in gastric affections, and is said to be very useful in flatulent dyspepsia, heartburn, catarrh of the stomach and bowels, etc.

In diphtheria and croup its value has been established; a two volume solution is specially recommended in young children as a local application, and particularly after separation of the membranes, in order to remove the odor and disinfect the surface. Internally it is too quickly decomposed in the stomach to render much service as a source of oxygen to the blood. It might prove of value in gastric ulcer.

